

REMARKS

All claims of the present application were rejected in the Office Action mailed July 13, 2004. The specification has been amended to correct an error. Claim 8 has been amended and claim 29 has been cancelled. Reconsideration of the present application as amended is respectfully requested.

The specification has been amended to delete the Government Rights heading and corresponding paragraph. This section was inadvertently included in the application as originally filed. Claim 8 has been amended to clarify that "data" in line seven is intended to refer to the --data set-- recited in line 5 rather than the "data" introduced in line 2. Dependent claim 29 has been cancelled without prejudice to reconsideration in a continuing application.

Claims 1, 2, 6-9, 11-16, 19-21, 24, 25, 27, 28-35 and 37 were rejected as being anticipated by U.S. Patent No. 5,859,609 to Sheen et al. ("Sheen"). The Applicants respectfully traverse. In order to anticipate, each and every element and limitation of the subject claim must be disclosed in a single reference. There are several features recited in independent claim 1 that are not disclosed in Sheen. For example, claim 1 includes the features of determining a number of data sets from the data representative of an image of the person interrogated -- the data sets each correspond to a spatial frequency representation of a different portion of the person's image represented by the data. In other words, the data sets each correspond to a different portion of the person's image represented by the data.

In the Office Action, it was asserted that column 8, lines 32-37 of Sheen disclose such features. The cited passage follows the final step of a seven-step reconstruction algorithm described in Sheen. In step 1 of this algorithm, Sheen gathers sampled data over a cylindrical

aperture as designated by the function $s(\phi, \omega, z)$. In step 2, a 2-D FFT is applied to this data to transform it into the frequency domain, and further calculations are performed with the results in step 3. In step 4, the output of step 3 is interpolated onto a uniformly sampled grid to provide a rectangular coordinate-like model. This interpolated data is then subjected to an inverse 3-D FFT which transforms the data back into the spatial time domain in step 5 and the magnitude of this data is determined in step 6. Images are displayed/rendered from this magnitude data in step 7. Within the context of this explanation, the asserted passage of column 8, lines 32-37 immediately follows step 7, which is reproduced below:

This image reconstruction technique relies on formation of the image in the spatial frequency domain. The resolution obtained in the image can be determined by examining the extent or width of the coverage in the spatial frequency domain. For the cylindrical image reconstruction, the spatial frequency coverage is of a polar region shown in FIG. 5.

From this passage, “formation of an image in the spatial frequency domain” is directed to the FFT data transformation in step 2 for a single image wholly represented by the data, as confirmed in the following excerpt: “[t]he actual data processing of the above described seven steps [previously described with reference to column 8] produces a *single image* from a single viewing angle or arc segment of the 360° data.” Sheen, column 9, lines 34-36 (*emphasis added*). In contrast, as set forth in claim 1, data is established representative of an image of a person and the data sets are determined from this data that each correspond to a different portion of this image. There is no disclosure, suggestion, or teaching of multiple data sets in correspondence to spatial frequency representations of different image portions from data for a lone image. One of several embodiments that include data sets corresponding to different image portions is described

in connection with procedure 120 -- especially subroutine 170 -- and accompanying figures of the present application. While Sheen may disclose the reconstruction of several images, there is no disclosure, teaching, or suggestion to operate on different portions of a given one of these images. To the contrary, Sheen appears to only disclose combining multiple images for animation or the like -- not apportioning.

In another example, the features of claim 1 include adaptively processing each of the data sets to identify a man-made object being carried by the person beneath clothing. In other words, each of these data sets (corresponding to a spatial frequency representation of a different portion of the person's image) is submitted to adaptive processing to identify the man-made object. The Office Action asserts that column 9, lines 30+ disclose such features. As a careful review of this citation reveals, there is no disclosure to even form such data sets, let alone process them -- adaptively or otherwise. Moreover, processing of the data sets as recited in claim 1 identifies the man-made object carried beneath the person's clothing. In contrast, Sheen only recites visual inspection of the resulting image or images by an operator, as exemplified in column 2, lines 18-21:

When the increments are small enough, the image will appear that the target is rotating slowly. An operator is then able to fully visually inspect the target for concealed objects.

Indeed, there is no disclosure regarding any type of processing that identifies a man-made object concealed or otherwise.

Moreover, "processing" is modified by "adaptively" in claim 1. Adaptive processing is a term widely used in computer technology field understood by those skilled in the art to be a form of machine learning and/or artificial intelligence. An adaptive process "learns" by reconfiguring

itself during performance in response to past observations (results) to provide a more desired output. This category of processing includes neural networks, fuzzy logic-based processing, expert learning systems and the like, as described for instance, on page 22, lines 6-14 of the present application. In contrast, a standard nonadaptive program lacks reconfigurability to learn how to provide an improved output. In column 10, line 62 - column 11, line 9; Sheen describes computer instructions to implement the reconstruction algorithm, suggesting a nonadaptive process – and at the very least being silent as to the form of processing. Accordingly, there are numerous features of claim 1 not disclosed by Sheen, any one of which defeats anticipation.

Turning to independent claim 8, among its novel features are “identifying a concealed man-made object by analyzing the data set with a neural network” where such data set corresponds to a spatial frequency representation of at least a portion of an image of a concealed surface. Sheen fails to disclose identifying a concealed man-made object through analysis of a data set with a neural network or any other form of processing -- instead relying on an operator to visually inspect the image for concealed objects. Moreover, Sheen lacks any disclosure of a “neural network” giving such term its broadest, reasonable interpretation. Accordingly, it is believed that multiple grounds also support the novelty of claim 8.

The novel features of 15 include “analyzing the data with a neural network to identify a man-made object being carried by the person beneath clothing” where this data corresponds to a spatial frequency representation of a surface beneath the clothing. Sheen fails to disclose analyzing such data to identify a man-made object and also fails to disclose any type of neural network as recited in claim 15. Accordingly, it is believed that several reasons support the novelty of claim 15, too.

teaching, or suggestion of separately transforming data corresponding to different image portions.

In a further example, claim 14 further defines claim 8, wherein identifying the concealed object by neural network analysis of the data (in claim 8) includes comparing information between two or more overlapping image frames. This neural network comparison of image frames is not disclosed in Sheen. In yet another example, the features of claim 25 further distinguish from Sheen by including that each of the data sets correspond to a spatial frequency representation of a respective one of the different image portions.

With regard to claim 35, it is asserted in the Office Action that “it is inherent that Sheen teaches that the device is in the form of a processor-readable memory and the logic is in the form of a number of instructions stored in the memory because this is how computer operated systems are designed.” However, “[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art.” Ex parte Levy, 17 USPQ2d 1461, 1464 (USPTO Bd. of Pat. App. And Interferences 1990) (emphasis in original). In this case the requirement that the logic is in the form of a number of instructions stored in the memory does not necessarily flow from the teachings of the Sheen reference as it would be possible for the logic to be dedicated circuitry, hardwiring without memory, or the like. Therefore, it is not inherent that Sheen teaches these features, contributing to the numerous reasons supporting patentability of dependent claims rejected as being anticipated by Sheen.

Dependent claims 3, 4, 17, 18, 22, 26 and 38 were rejected under 35 U.S.C. § 103(a) as obvious over the Sheen reference in view of U.S. Patent No. 6,700,526 to Witten (“Witten”).

The undisclosed features of claim 21 include “determining a number of data sets each corresponding to a respective one of a number of different image portions” and “numerically processing the data sets relative to one or more criteria to evaluate if one or more of the different image portions reveals a man-made object beneath the clothing.” Sheen fails to disclose determining a number of data sets each corresponding to a different portion of an image for at least the same reasons explained in connection with claim 1. In addition, Sheen fails to disclose any form of numerical processing to evaluate if one or more such portions reveals a man-made object. In contrast, Sheen relies on visual inspection of the image by an operator. Thus, many reasons also support the patentability of claim 21.

The features of independent claim 34 include being operable to generate data sets that each correspond to a spatial frequency representation of a respective one of a number of different portions of an image of a person. Other features of claim 34 include operability to “adaptively process the data sets ... to determine if one or more of the different portions of the image show a man-made object concealed by clothing of the person.” For at least the reasons provided in connection with claim 1, Sheen fails to disclose such features. Accordingly, it is respectfully submitted that claim 34 is also novel over Sheen.

Besides the patentability of the base claims, further reasons support the patentability of correspondingly rejected dependent claims. For example, claim 2 further defines claim 1 wherein determining the data sets (in claim 1) includes performing a Fourier transform operation for each of a number of different portions of the data (representative of the image) to provide a number of complex spatial frequency data representations. In contrast, the seven-step algorithm of Sheen performs 2-D FFT on sampled data for an entire, single image with no disclosure,

The Applicants respectfully traverse. As an initial matter, these claims are patentable for at least the same reasons provided for the corresponding independent claims. Moreover, even more grounds support these dependent claims as explained in the following.

In the paragraph bridging pages 4 and 5 of the Office Action, Witten is asserted to disclose “a method and apparatus that automatically extracts image features from complex spatial frequency data inherently using some type of filter that is able to distinguish desired returns from the entire return spectrum.” Inherency requires that the asserted feature, a filter in this case, must necessarily flow from the teachings of the reference. With respect to Witten, it is sheer speculation that a filter is used at all giving it the broadest reasonable meaning. Indeed, there are numerous ways to derive Witten’s output. In fact, as described in column 12, lines 53-67; Witten discerns features with its feature processor 110 by relative comparison to background levels without mention of any type of filter or filter processing, and may perform extraction with discriminator 114 through correlation, pattern recognition, or the like. (Witten, column 13, lines 32-45).

Further with regard to claims 3 and 38, it is asserted that Sheen teaches that “features are extracted from complex spatial frequency data” and that Witten teaches a “method and apparatus that automatically extracts image features from complex spatial frequency data inherently using some type of filter that is able to distinguish desired returns from the entire returned spectrum.” However, as previously discussed, Sheen does not teach or suggest extraction of features; -- Sheen merely displays the reconstructed image.

With regard to claim 4, in the Office Action the Examiner expressed uncertainty about the meaning of a “radially invariant and angular invariant filter.” Examples of these filters are described in figure 8 and accompanying text of the present application. It is respectfully

submitted that neither the Sheen nor the Witten references teaches or suggests the use of “radially invariant and angular invariant filter[s].”

With regard to claim 17, 18 and 26 it is asserted that “Sheen teaches that the determining [a number of image portions from the data set] includes performing a Fourier transform operation for each of a number of different portions of the data to provide a corresponding number of complex spatial frequency data representations” citing column 6, line 14 to column 7, line 67 of the Sheen reference. This passage is directed to the derivation of the mathematical relationships that are then utilized in the seven-step algorithm of column 8 of Sheen, and it lacks any indication that different portions of the data are being transformed to provide multiple complex spatial frequency representations relative to an image.

With regard to claims 22, it is asserted that “it would have been obvious for Sheen to implement ... a feature that inhibits the displaying if certain criteria (presence of an object) because there would be no need to display an object if it was not present ... the operator at a security checkpoint is only interested in being alerted when an object of interest is present!” The Applicant respectfully disagrees. To begin, this assertion begs the question: how does Sheen teach detection of a concealed object other than by visual inspection? Without such capability, an irrational leap in logic is being made. Moreover, this assertion is inapposite to the main goal of Sheen, which is to satisfy “a need for a three-dimensional holographic imaging method and apparatus that can provide high resolution with fast scanning and fast image reconstruction.” Sheen, column 1, lines 61-63. This goal is premised on visual inspection by an operator of the reconstructed image – no other approach is described in Sheen.

“The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability

of the modification.” In re Fritch, 23 USPQ2d, 1783-84 (Fed. Cir. 1992) (holding that a combination of references does not render a claim obvious due to a lack of suggestion or motivation to combine or modify). As a corollary, the patent office has recognized that “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claim *prima facie* obvious.” Manual of Patent Examining Procedure (MPEP) §2143.01. Inhibiting display of the image as asserted in the Office Action is contrary to Sheen's objective and undermines its operating principles.

Claims 5, 23, 36, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Sheen reference. The Applicants respectfully traverse. These claims, all being dependent, are patentable for at least the reasons given in regard to the respective base claims. In the Office Action it was contended that the “use of a neural network is quite common in the modern world and it therefore would have been obvious to send data to other parts of a network for analysis.” Rejecting a claim under §103 just because a given feature is “quite common” is improper, failing to provide any explanation as to why the modification is suggested/motivated.

Moreover, the suggestion/motivation to combine or modify under §103 needs to be specific. Where a “statement is of a type that gives only general guidance and is not specific as to the particular form of the claimed invention and how to achieve it ... [s]uch a suggestion may make an approach 'obvious to try' but it does not make the invention obvious.” *Ex parte Obukowicz*, 27 USPQ2d 1063, 1065 (U.S. Pat. and Trademark Off. Bd. of Pat. App. & Interferences 1993) (*citations omitted*). “Conclusory statements of similarity or motivation, without any articulated rationale or evidentiary support, do not constitute sufficient factual findings.” MPEP §2144.03.III.

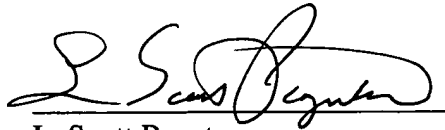
Similarly, the rejection asserts that it would be obvious to display a person in a gender-neutral representation to avoid any potential embarrassment to those being imaged. To the contrary, Sheen wants to provide “a three-dimensional holographic imaging method and apparatus that can provide high resolution with fast scanning and fast image reconstruction” that is suitable for visual inspection by an operator to detect concealed weapons. Sheen, column 1, lines 61-63. How is a gender neutral representation going to accomplish such goals? Indeed, Sheen unabashedly displays images of private body parts in several of its figures. Moreover, because Sheen fails to teach or suggest any kind of processing to detect such weapons, it makes no sense that Sheen would thwart visual inspection of such areas.

As a further consideration, it should be appreciated that discovery or recognition of a problem not in the prior art contributes to patentability. *In re Zurko*, 42 USPQ2d 1476, 1479 (Fed. Cir. 1997) (*citing In re Spinnable*, 160 USPQ 237, 243 (CCPA 1969) (“[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified.”). The gender-neutral representation is directed to the discovery that privacy of certain human features beneath clothing that can be revealed through the described imaging technique presents a significant drawback to its use. See, for example, page 23, line 21- page 24, line 4 of the present application. It does not appear that the prior art recognized such a problem -- let alone its solution.

To the extent that the assertions in this rejection are based on general common knowledge or “well-known” prior art, the Applicants respectfully request one or more references in support of these contentions in accordance with MPEP § 2144.03, or that the rejection be withdrawn.

In view of the foregoing, it is believed that claims 1-28 and 30-40 are in condition for allowance. Reconsideration of the present application as amended is respectfully requested. The Examiner is encouraged to contact the undersigned by telephone to resolve any outstanding matters concerning the present application.

Respectfully submitted:

A handwritten signature in black ink, appearing to read "L. Scott Paynter", written over a horizontal line.

L. Scott Paynter
Reg. No. 39,797
Woodard, Emhardt, Moriarty,
McNett & Henry
Bank One Center Tower
111 Monument Circle, Suite 3700
Indianapolis, Indiana 46204-5137